

REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested in light of the following discussion.

Claims 1-32 are pending, Claims 1, 5, and 7 having been amended, and claims 4, and 33-36 having been cancelled without prejudice or disclaimer by way of the present amendment.

In the outstanding Office Action Claims 1, 2, 17 and 32 were rejected as being anticipated by Grubb et al. (U.S. Patent No. 6,282,002, hereinafter "Grubb et al."); Claims 3-31 were rejected as being unpatentable over Grubb et al. in view of European Patent Application 11021142 (Emori et al., hereinafter "Emori"); Claims 11, 14, 26, 29, 33 and 34 were rejected as being unpatentable over Grubb et al. in view of Stentz et al. (U.S. Patent No. 6,163,636, hereinafter "Stentz"); Claims 35 and 36 were rejected as being unpatentable over Grubb et al. in view of Stentz and in further view of Emori.

In reply, Claim 1 has been amended to include the features of dependent claim 4, namely that shorter wavelengths of said pumping lights are used for forward pumping so as to flatten wavelength dependencies of noise figure in the WDM signal band. Support is found at least in the last paragraph of page 28 of the specification, as well as original Claim 4, and therefore no new matter is added. Claim 1 has further been amended in light of the remarks made at paragraph "d" of page 4 of the outstanding Office Action. Namely, Claim 1 has further been amended to clarify that the "calculating" step is performed before the "carrying out" step, which in turn is carried out before the "changing" step.

Therefore, amended Claim 1 is directed to a Raman amplification method that includes three consecutive steps. First, a combination of optical powers is calculated at two or more different pumping wavelengths in backward pumping so as to provide a substantially flat Raman gain. The subsequent step is to carry out bidirectional pumping with at least part

of the pumping lights wherein the bidirectional pumping includes the backward pumping.

The last claimed step is to change the respective distribution of pumping power to wavelength of the bidirectional pumping, wherein the shorter pumping wavelengths are used for forward pumping so as to flatten the wavelength dependence of noise figure in the WDM signal band.

In paragraph "d" on page 4 of the Office Action, the Office Action explains that the argument raised in the March 2, 2006 amendment was not persuasive because the sequence of the steps was not expressly claimed, and therefore, the Office Action relied on Grubb as being an anticipatory reference even though it did not teach the claimed steps in the sequence listed in the claim. Applicants agree that Grubb does not disclose the steps in the claimed order, and therefore Grubb does not anticipate, or even render obvious the invention of amended Claim 1. In view of the amendment to Claim 1, and in light of the distinction between the claims and Grubb as recognized in the Office Action, it is believed that Claim 1 distinguishes over Grubb.

Furthermore, Claim 1 has been further amended by incorporating the features of Claim 4, and by expressly stating that the use of the shorter wavelengths for forward pumping is to flatten the wavelength dependence of noise figure in the WDM signal band. The wavelength dependence of noise figure alone with "gain-flattening" counter pumping, which is calculated in the claimed "calculating" step, tends to degrade at the shorter wavelength side. The present inventors recognized this problem, and addressed the problem with bi-directional pumping in which the forward pumps are only used on the shorter wavelength side, and with pump powers calculated in the calculating step. According to this combination of features, the present invention allows for efficient flattening of the wavelength dependence of noise figure in the entire WDM signal band. A further advantage of the claimed procedure is that it allows for the setting of pump powers, followed by checking of gain profile, with

final adjustment of output pump power. It is believed that is combination of features is not taught or suggested in the prior art.

It is believed the arguments presented in the Amendment of March 2, 2006 continue to apply, and therefore are incorporated herein by reference. However, the newly made arguments, in light of the present amendment, further distinguish the invention defined by amended Claim 1 over each of the prior art references. Thus, it is respectfully submitted that Grubb et al. does not disclose the combination of steps, namely calculating optical power in backward pumping, then carrying out bidirectional pumping, and then changing the respective distribution of pumping power for the bidirectional pumping. As Claim 2 depends from Claim 1, it is respectfully submitted that Claim 2 patentably defines over Grubb et al. Likewise, Claims 17 and 32 are believed to patentably define over Grubb et al.

As Emori does not cure the deficiencies described above with regard to Grubb et al., it is respectfully submitted that no combination of Grubb et al. in view of Emori, can teach or suggest all of the elements of Claims 3, and 5-31 for substantially the same reasons as discussed above with regard to amended Claim 1.

Likewise, although of differing statutory class and/or scope, it is respectfully submitted that the assertion of Stentz does not cure the deficiencies discussed above with regard to Claim 1 for Grubb et al. Therefore, it is respectfully submitted that Claims 11, 14, 26, and 29 also patentably distinguish over the asserted prior art.

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Consequently, in view of the present amended and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 1-32, as amended, is patentably distinguishing over the prior art. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

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